7: NO: 3

HAMADRYAD

Heosemys silvatica

FOREST CANE TURTLE

CENTRE FOR HERPETOLOGY
MADRAS CROCODILE BANK
POST BAG No. 4
MAMALLAPURAM 603 104
T.N., S. INDIA

HAMADRYAD : NEWSLETTER OF THE MADRAS SNAKE PARK TRUST

7 : No.3 September 1982

News from the MADRAS SNAKE PARK and
MADRAS CROCODILE BANK

J. Vijaya was able to find a specimen of the rare forest cane turtle Heosemys silvatica in Kerala (see page.2).

30 rat snakes were sent to Bangalore at the request of the Clive Stud Farm for release on their property, to help control the rodent population.

Mark Davidar is now Manager of the Snake Park.

A member of the Irula Snake Catcher's Co-operative has been hired by the Bombay Natural History Society to assist in their ecological survey of Bharatpur Sanctuary.

15 rock pythons Python molurus from 16 eggs hatched in mid July. The Park hopes to be able to begin a python release programme in cooperation with the Forest Department in the near future.

Of three spectacled caiman nests laid at the Crocodile Bank on 18th April, 15th May and 11th June, 2 have hatched; and 15 hatchlings are being reared on chopped fish.

The Tamil Nadu Electricity Board has installed a transformer at Vadannemeli village. With this three phase connection it will now be possible to use the freezer and our fish and meat storage problem is solved.

50 mugger eggs in their 30th day of incubation were sent 600 kms. by train to the Bihar Forest Department for their crocodile project, most hatched.

30 mugger in the 1-1½ m size class were supplied to the the Damodar Valley Authority, Bihar, for release in the project area.

Madras television has made a film on the Crocodile Bank and plans are underway for one about the Snake Park.

Dr. Elliott Jacobsen, the veterinarian on consultancy to the UNDP/FAO Govt. of India Crocodile Project, spent a day at the Madras Crocodile Bank.

The first meeting of the IUCN/SSC Snake Specialist Group is to be held at the Crocodile Bank premises during 8 to 12 November. See page.12.

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Rediscovery of the Forest Cane Turtle (Heosemys silvatica) of Kerala

After a period of 67 years, the forest cane turtle Heosemys silvatica has been found during a recent survey in the Kerala forests by the Snake Park. H.silvatica was first discovered by Dr Henderson (Smith, 1931). Subsequent attempts to look for it- including one by the Madras Museum- proved unsuccessful (Groombridge, in print). This small and little known turtle is entirely terrestrial. It is found in evergreen forest in Kerala at about 2000 ft (Smith, 1931; Pritchard, 1979); also in groves of reed bamboo (Ochlandra travancorica) at lower altitudes. Males attain an adult size at about 120 mm.

A single mature male specimen of this species was found in July 1982, presumably the third known turtle of its kind.

Heosemys (Geomyda) silvatica (Henderson 1912)
Type specimen 3

	Carapace length	Carapace breadth	Plastron length	Plastron width	Shell height
	129.2mm	93.5mm	108mm	77mm	45mm
NN	127.2mm	-	118.5mm	-	-
Curve	137.0mm	117.0mm	124 mm	86mm	-

Bridge length	-	45.5 mm
Hindlobe length	-	46 mm
Forelobe length	-	38 mm

According to the Katumaran tribals, forest cane turtles are difficult to find, because of their small size and their habit of hiding in groves of eeta or reed bamboo, under dead leaves, logs, etc. The tribals call it 'Churel Aamai' after the forest cane (Calamus rheedi) under which it shelters. The meat is said to be exceptionally tasty and hunting dogs are used to find them (supposedly by their smell). The breeding period is said to be in the 'Kanya' or Virgo month (October-November) just after the monsoon.

Tribals said that Heosemys is sometimes found feeding on the fallen yellow fruits of 'Ponne' (Dillenia pentagyna) Cordia obliqua (red berry fruit) or on fallen jack fruit (Artocarpus heterophyllus). Apparently jack fruits attract many Geochelone travancorica as well.

In captivity the behaviour of this turtle suggests that it might be nocturnal. It feeds and moves about at night while in the daytime it withdraws into its shell, keeping its eyes shut. The specimen collected has an attractive red head, the jaw surfaces are pale yellow, the neck deep brown. The limbs and tail are pale brown.* The carapace is orangish. The scutes seem slightly

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*There is a 2 mm long spur-like protruberance laterally on the posterior part of the hindlegs which may be sexually diagnostic.

imbricate and frayed at the edges. It is estimated to be over 10 years old. The plastron is yellow-orange with two brown irregular blotches on either side of the bridge. The head is large and the upper jaw is hooked. It has been feeding on fruits.

Acknowledgements

This survey could not have been successfully accomplished without the help and encouragement of the Chief Conservator of Forests Kerala and other officials of the Kerala Forest Department.

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J Vijaya
Madras Snake Park

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Invoking raingods

(from Indian Express, 26.7.82)

On a more serious note, readers of Hamadryad will be happy to know that frogs are being used in Asansol District, W.Bengal to invoke rain. Marriages are arranged between male and female frogs, with palanquins, feasts and much fanfare. And- before you throw this down in disgust- after one such marriage there was a heavy downpur. That is, downpour.

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SSG Newsletter

Because of the forthcoming Snake Group meeting, the group's newsletter will be put out separately to coincide with it. It will be circulated to group members only; others wishing to receive it must send postage cost (Re.1 local, $ 1 foreign)

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Bangladesh: a general survey

I spent six weeks in Bangladesh during April-May '82, mainly looking at crocodiles and gharial but also running into a lot of frogs, turtles, lizards and snakes. Two weeks of this time were spent in the Sunderbans, the largest mangrove forest in the world.

Frogs and froglegs

Because I was looking for possible sources of protein for crocodile farming, I examined the frog leg industry. 80% of the frog is thrown away and the hind legs skinned and frozen for export to European countries and the U.S. The bullfrog Rana tigerina is the main species used in the trade because of its large size. However dealers mentioned that some European countries prefer the smaller legs and it seems likely that the ubiquitous skittering frog Rana cyanophlictus and the paddy frog R. limnocharis are also used. Exports for the last four years have been:

1977 - 78	1,585,000	lbs of legs
1978 - 79	3,723,000	lbs of legs
1979 - 80	1,810,000	lbs of legs
1980 - 81	1,981,000	lbs of legs

The average for the four years was 2,270,000 lbs with an average value of 15 Taka per pound (70¢ US). The frog-leg season coincides with the monsoon (May-September) and unfortunately also with the breeding season of the amphibians (though some breeding was evident in the pre-monsoon showers during April). Some of the obvious factors which should be examined regarding this massive frog kill are: actual numbers exported, optimum commercial size and time taken to reach it, breeding biology, size and selectivity in catching, population densities and habitat requirements, diet.

One point of interest extrapolated from this trip was the number of frogs exported. This was done after learning that 75% of the legs were in the range of 6 to 8 pairs per pound, most of the rest in the 9 to 12 and 13 to 15 pairs per pound range and some in the 4 to 6 range. The estimated annual export of legs equals over 18 million frogs. Wastage conservatively accounts for another 2 million- 10%- for a whopping total of 20 million frogs. At the time of writing an FAO consultant is in Bangladesh assessing the situation and closed seasons, closed areas and frog farming are being discussed. The government is to be congratulated on this step; an important outcome would be to establish a size limit, banning the taking of frogs in the 4-6 pairs per pound range and over; in other words, protecting the adults.

As a matter of interest, some details of the Indian frog-leg industry as reported in the 'Hindu' of March 28th: 8,736,000 lbs of frog legs were exported from India in 1981 to Netherlands, U S A, Belgium, France, West Germany and Canada for a total earning of Rs. 119,6000,000.00 (about US$ 1,33,00,000). Assuming

a similar size breakdown to the Bangladesh exports, India gave the chop to a grand total of 70 million frogs in 1981, a lot of them Rana hexadactyla the green frog (which is according to Dr Reza Khan, not abundant in Bangladesh). The Kerala Agricultural University has started a 'frog breeding centre' at Kumarakom near Kottayam which is good news. But if the industry is to withstand this pressure then size limits and closed seasons had better be implemented in a hurry. It should be stressed here, that the people who catch and earn money from frogs are often tribals with no other source of income.

To go back to Bangladesh frogs, there were large numbers of R. tigerina and R. cyanophlictis in the Sunderbans in areas 5 km from the sea, such as Supoti Forest Station where water salinity in November is recorded to be 425 mg per liter. In Rajshahi paddy frogs were calling everywhere in response to the May rains: the tonal differences made calling frogs of different size classes sound like different species.

Turtles, sacred and profane

Fortunately Muslims don't eat turtles or else Bangladesh would see exploitation levels like those of west Bengal, Orissa and Bihar in India. As it is, many thousands of turtles are caught every month for local consumption by Hindus and Christians and for an increasing export trade. While figures are available for numbers exported, numbers of turtles caught for the local trade can only be qualitatively estimated. Hundreds of common pond turtles (Lissemys punctata) were seen in markets in Chittagong, Chalna and Narayanganj (near Dacca) this year in April, as were also about 150 peacock softshells (Trionyx hurum) and 20 Ganges softshells (T. gangeticus). Emydine turtles were less common in the markets; at Chalna I saw a large sack with about 50 Morenia petersi, Kachuga dhongoka and Kachuga tecta. The main turtle season is winter, as in North India. Two export firms in Chittagong handle a large percentage of the turtle exports, the majority of which go out alive to Hong Kong, Malaysia and (to a lesser extent) Thailand. The main softshell exported is apparently Trionyx hurum with an average weight of 4 kg and a maximum of 20 kg. A large hardshell is also apparently exported which from dealers' descriptions may be Hardella thurgii. Lissemys are mainly caught by hand at pond edges and in paddy fields; other species are usually netted.

The value of turtle exports for the past 5 years is given below in US$:

	1976/77	1977/78	78/79	79/80	80/81 Jul-Nov
Live turtles	59,350	276,000	345,700	647,000	299,950
Turtle meat	-	2,300	-	3,450	-
'Tortoise' shell	450	2,300 ?	-	3,450 ?	-

Rob Oliver (1978) writes- "it is openly admitted by officials that the legal, documented trade in turtles represents the visible "tip of the ice-berg" with large quantities being

smuggled out, principally to India. The ecological implications of this massive exploitation are unknown."

Turtles are still abundant in Bangladesh and a day rarely passed when I didn't see one or more basking at a roadside pond, or coming up for air. Sitting for several hours on a high bank of the Padma River in Rajshahi District, Reza Khan and I watched numerous turtles- the Ganges softshell, H.thurgii and little Kachugas coming up to breathe below us.

Sacred turtles at Chittagong

For $ 3 I was taken to the Biazid Gostami Shrine outside of Chittagong in a very bumpy motor rickshaw. The large pond (100 x 150 m) has a small mosque at one end and the shrine is on a small hill behind it. About 100 people, mainly women and children, were at the edge of the pond feeding the turtles with puffed rice, bananas and squares of bread on skewers, bought from vendors. There were usually 12-15 of the big locally endemic softshells (Trionyx nigricans) being fed at a time with smaller ones joining in more timidly. The larger specimens were up to 80 cm in length and the largest one I saw appeared to be a male, judging from tail length. There were several which had head markings like Trionyx hurum; the carapaces of all were covered in algae. The big ones were especially crusty looking with white callosities on front of the shell, top of head and feet, which could be scars from the frequent bites they get while feeding. Some of these weigh an estimated 20-30 kg.

Women were stroking and cleaning the big turtles which seemed to enjoy the attention. Some of the old women were crooning to the turtles and calling them: ah, ah, bah, bah, in the village manner of calling livestock. The local belief is that if a woman is barren she should visit here, eat some mud off a turtle's back and drink some of the pond water to achieve childbirth.

From talking to the people it is assumed that the female turtles lay their 15-20 eggs on the hillside behind the mosque, as the surrounding banks of the pond are submerged during the monsoon. No young were observed but there is plenty of good habitat close by, with village ponds and small khals or streams. Eggs are said to be laid in April and may hatch in May a year later. Two females were seen outside the pond, walking jauntily down the road past people and rickshaws 100 metres from the water. The turtles' muddy backs indicated their liking to stay buried at the bottom of the pond. I have a hunch that a thorough investigation of the ponds and khals around the pond will reveal that the T.nigricans population is not restricted to the semi-captive group at the shrine. A careful approach to the religious leaders at the shrine would enable a zoology student to collect valuable data on the natural history and breeding biology of this rare and interesting species.

Batagur baska, alive and well?

Ed Moll, in Pritchard's "Encyclopedia of Turtles" gives a fine account of this fascinating estuarine turtle. Once said to be common on the Hoogly River in West Bengal and heavily exploited, its numbers rapidly dwindled and the species has not been reported on the Indian subcontinent since the early 1900s.

In July 1981 Dr M A Reza Khan of Dacca University and myself identified a large turtle at the Mirpur Zoological Gardens in Dacca as a female Batagur baska. Its origin was not known but the nearby Sunderbans seemed to be the obvious place. In April this year I had the chance to chase up this clue. While talking with fishermen and forest workers in the Sunderbans, it was mentioned that a Noliyan villager, Korna Kantabodi, knew all about this big hardshell which they called 'Kata'. A few days later our launch pulled into Noliyan Forest Station and we met Mr Kantabodi. He and his people catch up to 200 katas during the monsoon (May-August), using strings of hundreds of hooks baited with keora (Sonneratia apetala) fruit. They recognize three types of katas:

Sundi kata- female, tan color, weighs up to 1½ maund (1 maund=40kg
Pora kata - male, black, up to 1½ maund
Balli kata- female, tan, very large, up to 2 maunds with smooth tightly fused shell.

Eggs are laid on sand banks during November-January, mostly during full moon but also otherwise and sometimes even by day. The main nesting beaches are in the southern part of Chandpai and Sarankola Ranges on the Sipsah, Katka and Kaga creeks. Kali Char and Passur Island were also mentioned as good areas. Eggs are said not to be generally collected in large numbers, but are preyed on by the abundant monitors and wild pig. Hatchlings are seen in March and April. The turtlers sell about half of their catch, getting up to 200 taka (US$ 10) for a big one over 15 kg.

Mr Kantabodi produced 4 shells which measured 36-56 cm carapace length over the curve and looked to me like they had to be Batagur. Then someone mentioned that a live one was being reared in the next village. We rushed across the fields under a noon sun and surprised the villagers with our interest in their turtle. It was a Batagur for sure, about 53 cm carapace length and about 20 kg, caught last year at Kaga Khal.

The Sunderbans Divisional Forest Officer Mr Ghulam Habib has been appraised of the existence of this important breeding population of Batagur; he mentioned that the fishing permits issued within the Reserve Forest are not valid for turtles. It appears that the Batagur's future is secure here. It is hoped that a research scholar from Dacca University or the Forest Research Institute will take up a study on the breeding biology of Batagur baska.

The recent Khulna District Gazetteer mentions an island 10 km off the south-west of the Sunderbans where large numbers of marine turtles lay their eggs in winter. It appears very likely that a Pacific Ridley arribada beach is waiting to be discovered!

Crocodilians

Gharial J C Daniel and myself reported that *Gavialis* is extinct in Bangladesh (Whitaker and Daniel, 1979). Since then, thanks to the efforts of Dr Reza Khan and the staff of the "Dainik Barta" (Daily News) of Rajshahi, we now know of several breeding pairs of gharial in the Padma and Jamuna Rivers.

On May Day '82 Reza Khan and I were trudging across a dry riverbed, 5 kilometres of white silt-sand shimmering in the early white sun, to Char Diar Khidipur. A few hundred metres from the Indian border a 20 m high bank provides nesting sites for two female gharial. The nests are right at the ferry landing so there is disturbance all day. Nearby is an encampment of the Bangladesh Rifles (BDR) who have taken an interest in protecting these nest sites. As no shooting is permitted near this border area, we saw plenty of brahminy ducks and other water birds. Gangetic dolphin abound and we saw numerous turtles: Ganges softshells, *Hardella* and *kachugas*.

The single male gharial ("khumir") was a fine 5 m long animal which steadily cruised its half kilometre core territory near the two nest sites. One female ("baishal") was about 4 m and the other was 3.5 m. The nest of the larger one was 10 m above the water line and contained 41 eggs which were laid between 7 to 10 April. The nest of the smaller female was not located but she approached within 6 m of us as we stood at one likely spot and we surmise that we were close to the nest.

We watched the male for several hours; it surfaced for 2-3 minutes at intervals of 8 to 30 minutes with an average of about 15 minutes. In the early morning and evening all three basked with head and neck held up out of the water, the summertime basking posture seen in the gharial at the Crocodile Bank. When the male surfaced the sound of his exhalation was audible over 100 m away. The well developed ghara seems to block the air so that the animal must force it out. The quick breathing cycle of the Gangetic dolphin causes an abrupt "shhhhh", giving it the local name "susu"; the gharial's breath is a long drawn out deeper hiss reminiscent of the whirring of a big movie camera.

There are 5 or 6 captive gharial in Bangladesh and perhaps 10 adults in the wild. In 1982, in addition to the BDR protection, Mr Noor Muhammed Sarker, Conservator of Forests (Wildlife) deputed the guards to watch the gharial nest sites for the duration of the incubation period. A plan for crocodile protection is being drawn up with the help of the Zoology Department of Dacca University.

Mugger There are two male and one female adult *C. palustris* at the Mirpur Zoo, Dacca. The nest site is unsuitable and the female has laid eggs without any hatching success for several years. Plans for improvements are underway. Again with Reza's enthusiastic help, one morning found us wading

the slimy bottomed crocodile pool with Mr K A Fattah, Zoo Curator. We roped the three mugger with a bit of trouble and much amusement for the Sunday morning visitors. The males were 2.58 and 2.34 m and the female was 2.41 m. The smaller male was obviously harassed and chewed up by the larger one.

I tried to explain to reptile keeper Abdur Rob that the single rope technique is not safe for catching salties. In a few minutes though we were in the C.porosus pen and the noosed salty was heading unchecked straight at me! I couldn't run, or jump- the pond bottom was too slippery- so I just spread my legs, did a quick step over the noose rope as it swung past and cursed bad technique. Reza was next in line and his little daughter Munia laughed appreciatively as he did his survival dance when the frightened croc coursed through the water on a tightening noose. The 2½ m male salty was eventually captured, measured and sexed,

But the last wild palustris in Bangladesh are the 5 or 6 residents of the tank at the holy shrine of Khan Jahan Ali near Bagerhat in Khulna District. Muslim pilgrims are more than gently induced by the numerous fakirs to buy a chicken for 15 taka or a small goat for 100 taka to be fed to the crocs. When I visited the shrine in April, Forest Ranger Omar Ali was along and bought a goat in regard for his father-in-law, gravely ill in Khulna. A bearded fakir called "uh, uh, uh, uh" for nearly half an hour before a 1½ m mugger turned up. Then suddenly a stupendous rain and wind storm swept down over the lake. We waited under a tin roofed shed and when the hail began it was deafening. In ten minutes the late afternoon sun was shining again through the clear air. The fakir took up his place once more at the bottom of the steps and started calling again, now and then giving the goat a squeeze to make it bleat an invitation to the truant mugger. He called "Come Dhalapar"(White-side) ,"Come Khalapar" (Black-side the same names given to the Khan Jahan Ali's original pair, over 400 years ago according to O'Malley's excellent description of the scene in his 1914 District Gazetteer report. A big mugger about 3½ m long finally came up, and when he was close enough the goat was hallaled and thrown in front of him. One of the fakirs had to wade in and throw the goat closer before the mugger grabbed it and submerged. This wader, an older man, showed us his white-scarred leg where a mugger once grabbed him 'by mistake' while he was feeding it a chicken. Though there is no big pile of hefty mugger such as those of Mango Pir near Karachi (see Hamadryad vol. no.), Bagerhat is very picturesque and importantly, these mugger are wild.

Saltwater crocodiles The word 'Sunderbans' has long evoked visions of the vast dark mangrove forests and all the mysteries of such a rich, dynamic habitat. During April 1982 I spent 2 weeks on a launch, the 10 metre 'Bana Sundri' with 6 crew and Forest Department staff, cruising the waterways of the four forest ranges of the Bangladesh Sunderbans. Most nights we slept aboard the launch, generally tied up at a Forest Station in a small creek safe from the sudden electric storms that were

a regular evening event in this pre-monsoon period.

Two weeks is not long to begin to know a 3,800 sq km mangrove forest. I had done some fascinating gazetteer reading at Dacca University, plus a WWF wildlife management report (2), Forest Working Plan, FAO reports (3,4) and the classic paper on the Sunderbans tiger by Heinrich (5). But the most important education was paddling dinghies into some of the innermost reaches of the 1300 sq km of waterways; slogging through thigh deep black mud up onto firm ground; sitting quietly next to the river with a fishing line between thumb and forefinger, listening to and watching life patterns in the forest; and talking to the bawalis (woodmen), fishermen and honey collectors who visit every part of this unique jungle.

On a smaller creek (khal) called Sapla Khal, Tofaizal Ali a Forest Dept. boatman took us warily through the forest at twilight. Avoiding the many sharp pneumatophores (air roots) was difficult in the dusky light of the forest floor but we eventually reached our goal, a stand of dense tiger fern (Acrostichum aereum) . The guard had his rifle cocked for a possible tiger and we walked cautiously forward with sticks toward a large mound of fern leaves, the nest of C. porosus. But the nest was unguarded; a bit early for nesting and the eggs were yet to be laid. I took a few pictures and measurements and opened the top of the metre high mound. Suddenly a big monitor- V. bengalensis- burst out of the nest among us, toppling us comically backwards. He made a fast getaway.

To digress from reptiles for a moment, we watched the otter men using their tame otters to herd fish into their nets. The high shark population inhibits fishermen from getting into the water to drive fish. Prawns were abundant here; and in spite of the somewhat sedentary existence boat travel provides, we were able to put away large quantities of these curried delicacies with our noon heap of rice.

Every forest has its special aura; there's nothing like being in an elephant area for keeping you on your toes. In most forests of the Indian subcontinent you don't think much about tiger and leopard any more though one might watch out for the odd bad tempered elephant or sloth bear. But here in the Bangladesh Sunderbans that special predator feeling is strong and pervasive, and you are always aware that there might be a tiger in that clump of bushes... and one that is not averse to eating the occasional man. Tigers are a part of everyday conversation here. Occasionally a man eater or cattle killer will make repeated visits to villages across the forest boundary (outside the Reserve Forest), and is then generally killed by Forest Dept. The fame of the Sunderbans maneaters was already secure 300 years ago when the French explorer Bernier gave his account of the precautions that had to be taken while travelling through the Sunderbans. It was some comfort to have x armed guards while thrashing around in thick bush looking for croc nests, but I'd give the benefit of the doubt to a determined tiger against one of the old bolt action .303's.

Last November a medium magnitude cyclone pushed a tidal bore up into the Sunderbans covering all the land waist deep. For me the significance was that the last season's crocodile nests were washed away. But the reality of what a cyclone in the Sunderbans is like was at least partially conveyed by the forest people we talked to. The deep silence before the onslaught; the battering wind rising to impossible fury stripping the leaves from trees; boats tossed and broken like peanut shells; the endless hours clinging to a stout tree, snakes sharing the roost. And the tiger, deer, wild boar also up there in the branches escaping the super tides.

We visited 8 salty nest sites and found at least one fresh mound. Wild pig nests resemble salty nests and both seem to like the stands of tiger fern. One scarred honey collector showed us where, years ago, a female saltwater crocodile leaped from the shallow wallow next to her nest and grabbed him by the leg. The reason: he had caught one of her newly hatched young whose distress cry triggered her attack. The man threw down the hatchling and was pulled from the crocodile's mouth by his friends.

The bright eyeshine of a crocodile was too infrequent on our night trips through the quiet channels and most of the crocodiles we spotted were wary and didn't allow a close approach. They had obviously been heavily hammered during the days of legal hunting. In these thousands of sq kms of good habitat though they could make a dramatic comeback with the help of a carefully managed rehabilitation program.

Man-eating by crocs has been rare in the Sunderbans, perhaps for the simple reason that women and children- main victims elsewhere- rarely enter the forest. We passed giant crocodile tracks on the mud banks but winter is the basking period. One of the tracks had an 84 cm belly width and the hind foot length was 38 cm; probably an 18 footer (5.5 m). On Jhapsi Khal off the Bhadra Gang we finally saw one of the big ones which swam lazily ahead of our launch for a full five minut before submerging with a powerful push of the massive tail, leaving swirls and whirlpools on the muddy surface.

Going west toward the Indian border the tall sundri trees (Heritiera minor) became scarce and the jungle was shorter and sometimes sparse, apparently due to the higher salinity. Tampering with the waterways upriver such as the Farakka barage may have profound negative effects on the delta ecosystem. The crocodile habitat is still spectacular though, and it is pleasing to know that gazetted or proposed sanctuaries contain some of the best croc concentrations.

Snakebite

To conclude this long winded trip report it is noteworthy to mention that Bangladesh, with 5 species of snakes potentially dangerous to man (cobra, banded krait, common krait, king cobra and Russell's viper) has no antivenom serum. There are no recent statistics but old gazetteers mention 50-100

deaths annually per District. The 1975 gazetteer mentions that Joydebhur Thana (222 sq km) had a yearly average of 80 snakebite deaths between 1949-59. As in India, most 'treatment' is done in the village by country doctors with herbs, chanting and even stranger rites. Hospital treatment is generally glucose or saline transfusion, pain relief and treatment for shock. Doctors I talked to spoke of helplessly watching patients go through the classic symptoms of neurotoxic paralysis and die. Depressing to think that one of the 200 aid agencies in Bangladesh hasn't come through with a supply of antivenom to a country that needs it so desperately.

A number of people rendered valuable help and company on this journey around Bangladesh including the Lockwood family, the Reza Khan family and the Bangladesh Forest Department; to these people I am very grateful for a successful trip.

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R Whitaker
Madras Snake Park

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IUCN/SSC Snake Group Meeting

You are invited to attend the first working meeting of the IUCN/SSC Snake Group which will be held in Madras during 8 to 12 November 1982. The premises of the Madras Crocodile Bank, Mahabalipuram Road, will be used for the meeting.

Please let me have an early answer regarding your accomodation requirements to enable us to make bookings at an nearby hotel.

MADRAS CROCODILE BANK TRUST 1982 GHER NESTING DATA

S.No.of Nest	Female Name	Date of laying	Date of hatching	No. of eggs	No. of eggs hatched	No. of rotten & infertile eggs	Percentage hatched	Remarks
1.	Vijaya	12.2.82	27.4.82	30	3 (5 eggs)	2		25 eggs to Ranchi
2.	Chitra	20.2.82	3.5.82	33	6 (8 eggs)	2		25 eggs to Ranchi
3.	Karuppu Kann	22.2.82	29.4.82	27	25	2	92.6	
4.	Metty	24.2.82	8.5.82	40	24	16	60.0	
5.	Chidambaram	5.3.82	15.5.82	29	17	12	58.6	
6. (Pit 10)	Code No.464	5.3.82	15.5.82	29	21	8	72.4	
7.	Stumpy	6.3.82	12.5.82	28	24	4	85.7	
8.	Amara	6.3.82	12.5.82	26	18	8	69.2	
9. (Pit 10)	Code No.734	6.3.82	28.4.82	20	16	4	80.0	hatched in pit 10 8 hatchlings missing of 16
10.	Nova ..	16.3.82	28.5.82	32	29	3	90.6	
11.	Misty	-	-	20	Nil	20	00.0	Apparently infertile
12.	Vijaya	30.3.82	24.5.82	28	21	7	75.0	
13.	Metty	8.4.82	20.6.82	11	6	5	54.5	
14.	Stumpy	17.4.82	27.6.82	19	18	1	94.7	
15.	Chitra	17.4.82	27.6.82	31	8	23	25.8	
				403				
		Ranchi	..	50				
	TOTAL ..	..	..	353	236	117	66.85%	

11 single and 4 laid double nests

Kachuga tecta hatching at the Snake Park

Six clutches of Kachuga tecta eggs were collected from the Rapti River near Gorakhpur on 6th, 7th and 8th December 1981. They were brought to the Madras Snake Park and buried under 4" of sand and nest soil in a 20" diameter basin. A siphonised water bottle was used to keep them slightly moist. The incubator was kept closed throughout.

The eggs numbered 6,8,4,7/5and 6 in each clutch and every nest was found in soft, clayey river bank soil. Total nest hole depths varied from 15 cm to 26 cm and diameter from 14 x 15 cm to 19 x 17 cm. Distance of nest from water ranged from 329 cm to 1400 cm and height above water from 100 cm to 550 cm.

Egg measurements (averages for each clutch) were:

	Length	Breadth	Weight	Incubation
Nest I	4.06 cm	2.88 cm	11.7 gm	134 days
Nest II	4.4 cm	2.6 cm	16.2 gm	134- 141 days
Nest III	4.53 cm	2.69 cm	13.3 gm	132- 140 days
Nest IV	4.5 cm	2.63 cm	12.5 gm	134- 136 days
Nest V	4.2 cm	2.61 cm	13.4 gm	128- 144 days
Nest VI	4.5 cm	2.73 cm	18.5 gm	125 days

Hatching percentages for the 6 nests were: 16.6%, 50%, 75%, 28.5%, 16.6% and 40%. The total hatching percentage was 36.

Incubation temperatures were:

Morning		Noon		Evening	
Nest	Air	Nest	Air	Nest	Air
27.6°C	27.3°C	27.9°C	28.2°C	28.1°C	28.5°C

Average hatchling measurements were:

	Carap. lngth	Carap. brdth	Plas. lngth	Plas. brdth	Shell ht.	Shell
I	27 mm	17 mm	23 mm	13 mm	16 mm	6.5 gm
II	32 mm	24.9mm	29.55mm	17mm	19mm	9.5 gm
III	32.7mm	27mm	29.2mm	19mm	18.9mm	9.8 gm
IV	31.6mm	25.4mm	28mm	18mm	18.3mm	8.75 gm
V	33.5mm	27mm	31.0mm	17mm	19.5mm	10gm
VI	30.5mm	23.1mm	27mm	15.8mm	17.1mm	7.25gm

The hatchlings were very active after hatching. Coloration varied from yellowish green to olive green. The lighter colored individuals acquired a darker pigmentation within a week. Tiny black spots appeared inside the scutes on the carapace.

The marginals also acquired black spots, along the bridge at first

and then throughout the underside. At present these are just darker regions along the underside. Some of the hatchlings have dark, almost black coloration on the snout deepening toward the frontal and fading outside the parietal regions. In other hatchlings this coloration is much lighter.

Again, some have dark pink spots on the temporal region while in others these are much lighter. Closely placed striations are seen on the neck in all hatchlings.

The hatchlings have been feeding voraciously on greens and the leaves of Eichornia crassipes the water hyacinth, of which the air bladders are especially relished.

J Vijaya
Madras Snake Park

May 27 1982

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Striped keelback hatchling size

On the morning of 22 October 1981, a farmer at Harendranagar, a village in 24 Parganas of West Bengal found a clutch of 5 Amphiesma stolata eggs in a grass clump along a pond bank. He opened 4 of these which had fully developed embryos on the verge of hatching, and brought these and the unopened egg to me. I opened the fifth egg also.

In Common Indian Snakes: A Field Guide (1978) Whitaker gives the A.stolata hatchling length as 9 cm. The following are the embryo measurements:

Snout-vent	Vent-tail	Sex
10.5 cm	5.5 cm	Male
10.5 cm	5.5 cm	Male
10.5 cm	5.5 cm	Male
11 cm	5.5 cm	Male
11 cm	5.5 cm	Female

The average length (total) was 16.4 cm.

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Breeding data on Melanochelys trijuga trijuga and Melanochelys trijuga coronata

2 clutches of Melanochelys trijuga trijuga and 1 clutch of M.t. coronata eggs were hatched at the Snake Park. A clutch of 5 eggs of M.T. trijuga was collected on 9th June '82. The eggs were removed from a 100 mm deep nest chamber; the nest opening was 100mm x 80 mm. Temperature within nest chamber was 31°C and air temperature was 34°C.

The eggs measured (average) 25.5mm in length, 25.7mm in breadth and weighed 15.7 gm. They were at the termination of their incubation period. One had hatched, the neonate having died within the nest chamber possibly due to asphyxiation. The hatchling measured 37.5 mm in carapace length, 24.5mm in width and with an 11 gm weight.

3 of these 5 eggs hatched between 16 and 21 June. Average size of the three hatchlings was: length 42mm, 32mm width and 12.6 gm weight.

The same female laid a second clutch of 5 eggs (laying date unknown) all of which hatched on 15 June. One hatchling died soon after. Average measurements of the 4 surviving hatchlings: 42.1mm length, 34.5mm width, weight 12.5 gm.

Another M.t.trijuga laid 6 eggs on 25 Jan'82; these were transferred to an incubation box on 4 March. One egg opened on 15 May was fully developed and was kept covered with damp cottonwool and buried in sand. It hatched on 30 May after a 125 day incubation period and measured 36mm in length and 16mm in depth. Its weight was 8.5 gm.
3 more hatched on 13 June and [illegible] on 24 July, 2 after 139 days and 1 after 180 days. Incubation temps. were 29.3°C nest, 30.1°C air minimum and 32.1° nest and 32.5° air maximum.

A Melanochelys trijuga coronata clutch of 4 eggs was laid on 10 Feb '82 by a female of 208mm length, 148mm width and 70mm shell height. Average egg measurements were: 47mm length, 25.5mm width and 17.6 gm weight. 2 of the eggs hatched on 25 May after a 105 day incubation. Incubation temperatures were 29.8° nest, 29.7° air minimum and 31.3° nest and 31.2° air maximum. Average measurements of the hatchlings were: 41mm length, 29mm width, 19mm depth and weighing 10 gm. Another record gives a 155 day incubation period for M.t.coronata and the following measurements for M.t.thermalis hatchlings: 39.3mm length and weighing 11.1 gm (Tryon, 1978). Deraniyagala (1953) gives the following data for a M.t.thermalis hatchling: 40mm length, 35mm width and 11 gm weight.

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Pelochelys bibroni from the Gahirmata coast, Orissa

Pelochelys bibroni is probably the most widely distributed freshwater turtle in the world having more or less the same range as the saltwater crocodile. It has been recorded from southern China south to the New Guinea island and westward from the Indonesian archipelago to Malaya and Burma (Smith, 1931). It is also the largest freshwater species, the record being a specimen 2 m long and weighing 250 kg from Vietnam (Constable, 1982). Pelochelys inhabits estuarine and marine areas as well (Nair and Badrudeen, 1975; Webb, 1981).

Smith (1931) reports that the occurence of this species in the Ganges delta is doubtful. However, accounts from Bangladesh (Hussain, 1953) confirm that Pelochelys has been seen in Bangladesh turtle markets. Recently this turtle has been reported from Palk Bay, 5 km off Mandapam on the southeastern end of the Indian peninsula (Nair and Badrudeen, 1975).

According to Mr Chandrashekar Kar, the resident marine turtle biologist at Gahirmata, Orissa, Pelochelys bibroni has been seen since 1977 (when he started his project) at the Gahirmata Marine Turtle Reserve. In December '77 Mr Kar noticed this freshwater turtle sharing the nesting sites of the Ridley sea turtle L.olivacea. According to Kar, Pelochelys approach the nesting beaches from both the sea and the river; nesting is heavier on the river side. Gahirmata beach is on the Brahmini and the Bitharini delta.

Pelochelys makes body pits before nesting. 20-28 eggs are laid. Both meat and eggs are valued by the local villagers. They have been caught 100 m offshore as well. This report could extend the ranges of this species along the coasts of the Bay of Bengal in suitable habitats south to the Palk Bay.

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A snake-mongoose encounter

Although the snake-charmer's "cobra mongoose fight"- between an emaciated cobra and a petrified mongoose- is now an inevitable tourist attraction in every city, authentic accounts of encounters in the wild are rare. This is an extract from a letter (June 16, '82) from Miss S Satakopan of Baroda, Gujrath.

We were waiting on the bank of a small stream in Sasan Gir (Gujrath) one afternoon in April during a bird watching trip. On the opposite bank, 50 ft away and thickly vegetated, there appeared a full grown mongoose. It was scuffling and gnawing at a large rat snake. They fought for about half a minute, the mongoose biting at the lashing and coiling snake. The snake got away briefly and tried to make off, but the mongoose threw itself over it and dragged it back. There ensued a right royal trial of might for two or three minutes; we could see a grey ball of fluff with thick silver and black coils around it, rolling and bouncing.

We watched the mongoose becoming hopelessly entwined in the snake's coils; its right fore-leg was paralysed. The rat snake did not seem to want to crush or constrict its victim, or even bite it, as it very well coulf have at this point. This strange deadlock continued for some five minutes, the snake neither releasing nor killing the mongoose, but groping, and swaying as though to feel its way. The pair was now about 3 ft from the water's edge, which was just a foot below the grassy bank. We had meantime moved to the edge of our bank and so were only 20 ft away. Through our binoculars we saw the mongoose blinking and looking quite alive.

The snake finally decided on a modus operandi- and started moving toward the water, dragging the mongoose with it! It took its load down the slope and into the water. The struggling mongoose could do nothing. When it was almost drowning, the snake released it and swam away very fast, fully stretched and cleaving the water like a knife. The released mongoose jumped on to the bank. We could see its rings of crushed fur but it appeared not to be injured except for a certain loss of dignity. It stood looking at us for a second, then disappeared into the bushes. And we then saw another mongoose, its companion, who had obviously been watching the show from under a bush!

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Sea turtles in Sri Lanka

I have been following sea turtle developments in Sri Lanka with interest over the past few years. During May I was able to spend two weeks looking at nesting beaches in the south, between Colombo and Hambantota. Dharmin Samarajiva and myself covered some 210 kms travelling by motor cycle and bus, stopping at 'good' beaches to talk to local fishermen and others. In my book "good" meant a wide stretch with smooth slopes irrespective of the human element.

The overall situation is not too cheering. Although the five species that use these beaches- greens, olive ridleys, hawksbills, loggerheads and leatherbacks- are protected, and there are frequent police arrests and fines, local people continue to plunder the eggs. Sea erosion and heavy tourism development reduce nesting areas yearly. Nesting turtles are caught and sold; many drown in trawl nets.

At Matara although the beach is eminently suitable for nesting, local people reported that numbers of females coming ashore have dropped drastically in the last few years. Veteran fishermen attributed this decline to the extensive use of ray and squid nets. Highway lights bordering the open beach also seem to discourage females from coming ashore. Near Bentota for instance on several occasions we saw greens coming out of the sea, ascend the shore for a few feet and then turn back without laying, apparently because of the bright lights. At Matara we also found a freshly stripped ridley shell and the fore and hind flippers of a hawksbill; one fisherman reported that as many as 16 turtles- mostly greens- were caught in a single large net.

Sea turtle meat- from all five species- sells at about Rs. 5 per pound (20 SL Rupees= 1 $US) and the main centres on the southern coast seem to be Alutgama, Dodanduwa, Boosa, Ratugama, Galle, Mirissa, Matara and Tangalla. The price of eggs varies from between 25 and 50 cents for those of greens, ridleys, loggerheads and hawksbills; leatherback eggs fetch a rupee and more. Hawksbill laminae is extracted in some places by oiling the carapace and warming the animal over a fire. After removal the turtle is reportedly released into the sea.

Tourism is becoming an important industry in Sri Lanka and a government-appointed Committee has recently compiled a list of places on the coastal belt where further tourism development is permissible. Although it is gratifying that due consideration has been given to preserving marine, mangrove and other eco-systems, no importance is given to protecting turtle nesting grounds. Included in the list of doomed beaches are many that are important nesting grounds of the 5 species.

One such area is the approximately 5 km stretch between Indurawa and Ahungalla where all five species are known to nest in large numbers. We spen a few nights here and saw 12 greens during one night. Others reported seeing 18 females of four species including the leatherback in a single night. And three years ago, 500 turtles came ashore in one night.

It is hoped that conservationists in Sri Lanka will make a determined protest against this beach being converted into a tourist resource because that would be the end of the nesting activity. The Wildlife and Nature Protection Society of Sri Lanka has a hatchery at Kosgoda, between Indurawa and Ahungalla. This year some 12,000 eggs were collected. These efforts will be in vain however if further development is permitted; already considerable land has been earmarked for resorts and hotels. Fences around these plots hinder turtles from coming ashore as we saw on several occasions.

Shekar Dattatri
Madras Snake Park .

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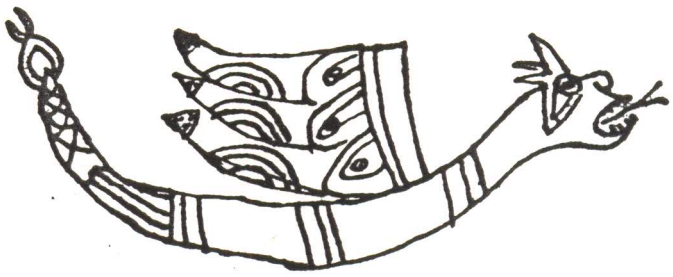

Freshwater turtles: the drug trade

A little reported but significant drain on the turtle populations within the Oriental Region is their use in the making of medicines and tonics. Turtle derived drugs have been used by the Chinese for treating certain ailments since at least 2737 B.C. (Nanking Pharmaceutics School 1961). Traditionally *Chinemys reevesii* has been one of the most popular species for this purpose. Although the meat, gall, blood and urine are all used for medicinal preparations, it is the plastron which is most important. A crude drug called 'gui-ban' is prepared by heating the bones until a gelatinous paste is formed. It is used for a variety of problems including tuberculosis, leukorrhea, malaria, dysentry, piles, etc. A similar drug with many of the same uses is prepared from the carapace of *Trionyx sinensis* and is called 'biejia'.

There are no figures on the numbers of turtles being slaughtered in China each year for use in medicines but it is evident that the supply is insufficient to satisfy the demand. China is currently importing turtles from neighbouring countries to satisfy this need. I first became aware of this trade when reading an article by Dr Shibata (1975) of the Osaka Museum in which he mentioned that at least 5 non-Chinese species of turtles were being imported into Hong Kong to substitute for *Chinemys* in the making of gui-ban. Shibata identified *Cyclemys dentata*, *Heosemys grandis*, *Malayemys subtrijuga*, *Geoclelone elongata* and *G.impressa* all of which occurred in Thailand and assumed that probably this is where the shipments originated. More recently, Dr Reza Khan from Bangladesh mentioned that large numbers of turtles in his country were also being shipped to Hong Kong, presumably for the same purpose.

In order to determine if this trade is seriously affecting the species of the area, I have begun to search for statistics on the subject. The first returns are in: In the last 6 months, 154,146 kg of freshwater turtles were imported into Hong Kong; 133,428 kg were from Bangladesh and 20,718 kg from Thailand. The majority of turtles in these shipments were said to be ca. 5 kg which translates into over 26,000 turtles from Bangladesh and over 4000 from Thailand.

From the standpoint of conservation, this trade has very serious implications. The full extent of the problem is difficult to assess since trade within each country often reguires no permits or accounting. Also while the Chinese rank as the greatest consumers of turtles for drugs and tonics, the practice is not restricted to them. The Japanese use gui-ban under the name of 'kiban'. I recently read (the Malay Nature Journal, June 1981) that pep pills made from turtles of South-East Asia (probably containing kiban) were being marketed in Japan. In India *Lissemys punctata* are being widely sold as a treatment for tuberculosis. In Malaysia, a Moslim country, turtles are eaten less but the eggs of many species are heavily exploited both as food and because they have reputed aphrodisiacal properties (a common belief in

tropical countries worldwide).

I am interested in collecting more information on the use of turtles in medicines anywhere in the world. If you can supply any data on medicinal uses or quantities of turtles being utilized in your area, I would appreciate hearing from you.

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Size of the Travancore tortoise Geochelone travancorica

Smith (1931) records that the carapace length of Geochelone travancorica corresponds to that of Geochelone elongata, growing to 275 mm in length with a breadth of 165 mm and 105 mm depth.

In Calcutta Zoo G.elongata were measured at 330 mm. Recently a carapace shell of G.travancorica was collected in Kerala measuring 300 mm notch to notch length, 309 mm total carapace length, 199 mm breadth and 130 mm depth.

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Sea turtle survey on Suheli Island

Satish Bhaskar, sponsored by World Wildlife Fund-India, is on Suheli Island in the Laccadive group to see the sea turtle nesting season through. There is no fresh water on the island, or contact with the mainland, though the coast guard will look out for distress flares during their patrols. Satish is spending 5 months on Suheli on his own and reached the island in early May. His wife has had one letter from him; found in a bottle by a Sri Lanka fisherman who forwarded it to her. Tracing its course we find that the 'bottle-letter' dated 3rd July has travelled a distance of about 500 miles in an estimated interval of 24 days. The letter reached Sri Lanka around 27th July.

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$ 4 annually (air-mail)

Cheques should be made to the Madras Snake Park Trust

Cover drawing by Shekhar Dattatri

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